

CLAIMS

1. A heat insulating plunger sleeve for use in die casting machines which comprises a hollow cylinder provided at a base end thereof with a molten metal outlet (13) adapted to communicate with a die (80) and connecting means (16) connectable to the die (80), the hollow cylinder having an opening (14) at an outer end thereof for a plunger tip (70) to be inserted thereinto and a molten metal inlet (15) formed in a peripheral wall thereof for injecting a molten metal into the cylinder therethrough,

the plunger sleeve being characterized in that the sleeve comprises a first metal layer (20) made of a metal having high heat resistance and providing an inner periphery of the sleeve, a second metal layer (40) providing an outer periphery of the sleeve, and a ceramic layer (30) formed between the first metal layer (20) and the second metal layer (40), the ceramic layer (30) comprising a ceramic powder and/or a ceramic fiber consolidated to at least 50% to not greater than 90% in relative density.

2. The heat insulating plunger sleeve for use in die casting machines according to claim 1 wherein the second metal layer (40) comprises a plurality of metal layers (41), (41), and a ceramic layer (30) comprising a ceramic powder and/or a ceramic fiber consolidated to at least 50% to not greater than 90% in relative density is positioned between the metal layers (41), (41).

3. The heat insulating plunger sleeve for use in die casting machines according to claim 1 or 2 wherein each of the ceramic layers (30) is up to 2 mm in thickness.
4. The heat insulating plunger sleeve for use in die casting machines according to claim 1 or 2 wherein the first metal layer (20) is 3 to 15 mm in thickness.
5. The heat insulating plunger sleeve for use in die casting machines according to claim 1 or 2 wherein the first metal layer (20) comprises, in % by weight, 0.32 to 0.42% of C, 0.8 to 1.2% of Si, up to 0.5% of Mn, 4.5 to 5.5% of Cr, 1.0 to 1.6% of Mo, 0.5 to 1.2% of V and the balance substantially Fe.
6. The heat insulating plunger sleeve for use in die casting machines according to claim 1 or 2 wherein each of the ceramic layers (30) comprises at least one powder or fiber selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3\text{-SiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{SiO}_2$ ,  $\text{Si}_3\text{N}_4$ , BN,  $\text{TiB}_2$ , SiC and  $\text{MoSi}_2$ .